

2.14 Series

Name _____ Date _____ Period _____

Write each sum using summation notation, assuming the suggested pattern continues.

1. $-7 - 1 + 5 + 11 + \dots + 53$

2. $2 + 5 + 8 + 11 + \dots + 29$

3. $1 + 4 + 9 + \dots + (n+1)^2$

4. $1 + 8 + 27 + \dots + (n+1)^3$

5. $6 - 12 + 24 - 48 + \dots$

6. $5 - 15 + 45 - 135 + \dots$

Find the sum of the arithmetic sequence.

7. $-7, -3, 1, 5, 9, 13$

8. $-8, -1, 6, 13, 20, 27$

9. $1, 2, 3, 4, \dots, 80$

10. $2, 4, 6, 8, \dots, 70$

11. $117, 110, 103, \dots, 33$

12. $111, 108, 105, \dots, 27$

Find the sum of the geometric sequence.

13. $3, 6, 12, \dots, 12,288$

14. $5, 15, 45, \dots, 98,415$

15. $42, 7, \frac{7}{6}, \dots, 42\left(\frac{1}{6}\right)^8$

16. $42, -7, \frac{7}{6}, \dots, 42\left(-\frac{1}{6}\right)^9$

Find the sum of the first n terms of the sequence. The sequence is either arithmetic or geometric.

17. $2, 5, 8, \dots; n=10$

18. $14, 8, 2, \dots; n=9$

19. $6, -3, \frac{3}{2}, \frac{-3}{4}, \dots; n=11$

20. $4, -2, 1, \frac{-1}{2}, \dots; n=12$

21. $-1, 11, -121, \dots; n=9$

22. $-2, 24, -288, \dots; n=8$

23. Find the first six partial sums of the following infinite series. If the sums have a finite limit, write “convergent”. If not, write “divergent”.

a) $0.3 + 0.03 + 0.003 + 0.0003 + \dots$

b) $1 - 2 + 3 - 4 + 5 - 6 \dots$

Determine whether the infinite geometric series converges. If it does, find its sum.

24. $6 + 3 + \frac{3}{2} + \frac{3}{4} + \dots$

25. $\frac{1}{64} + \frac{1}{32} + \frac{1}{16} + \frac{1}{8} + \dots$

26. $\sum_{k=1}^{\infty} 3\left(\frac{1}{4}\right)^k$

27. $\sum_{j=1}^{\infty} 5\left(\frac{3}{2}\right)^j$

Practice Review

28. A certain species of fox has a population density growth of 5.9 per square mile, per year in a certain region. Write an explicit rule for the sequence that represents the yearly density of fox in this region if the starting density is 8 fox per square mile.

Solve the following equations.

29. $\sqrt{4x-23}-3=2$

30. $\sqrt{x-6}=x-6$

Factor the following polynomials.

31. $12x^2 + 25x - 7$

32. $125x^3 - 64y^3$